

Research Items

Race and Language in India

WITH a view to possible light on the problem of race and language, Dr. D. N. Majumdar has investigated the physical relationship of certain Austric-speaking tribes of India with special reference to measurements of Hos and Saoras made by himself and others (*Proc. Ind. Acad. Sciences*, 7, 1; 1938). The relevant questions to be answered are: (1) Whether the Austric-speaking tribes in India and more particularly the Munda-speaking groups represent the same racial type; (2) Is there any racial difference between the Mundas and the Dravidian-speaking group? (3) Are the Hos and Mundas more variable than the Sonthal and Bhumij? Taking first the comparison of the Ho series from the Kolhan with the Mundas and Bhumij, two neighbouring groups, believed to be of the same racial stock, a comparison of the mean measurements shows that while there are quite marked differences between the three groups, the only significant difference between Hos and Mundas is in stature, while between Hos and Bhumij there is no evidence of difference except for the nasal measurements, which in the Mundas and Bhumij are of doubtful accuracy. Otherwise it is to be concluded that the three groups are of the same or similar origins. Comparison of the Saoras with the Hos and with the Mundas and Bhumij confirms the general belief that the Saoras are of an entirely different stock. Twelve comparable characters show in their means a significant difference in seven, especially marked in nasal length and bizygomatic breadth; but it is of interest to note that all four types are almost identical as to cephalic index. In regard to differences from the high caste Brahmans and Kayasthas, and the tribal Khasis of Assam, of ten characters, both absolute and indicial, significant differences exist between the Hos and Saoras and the caste groups—from the Brahmans in seven and from the Kayasthas in eight, these being interpreted as a racial difference. Between Hos and Khasis there are significant differences in six characters, the difference of the Saoras and Khasis being approximately the same.

Genetics of Schoolboys

In a study of the stature of 2,500 schoolboys in Sheffield between the ages of 5 and 17 years, Dr. M. A. MacConaill (*Ann. Eugenics*, 8, 117) divides them into three classes: blond, brunet and heterochrome; the blonds having blue eyes and fair hair, brunets brown eyes and dark hair, heterochromes all other combinations of eye and hair colour. The heterochromes were found to be significantly shorter than the blond and brunet groups at all ages except during puberty. They were also more variable than the blonds and brunets. In explanation of these significant results, it is suggested that the heterochromes are more heterozygous than the other two types. In an earlier paper by MacConaill and Ralphs in the same journal (7; 218) a study of the post-natal development of eye and hair colour was made in the same group of schoolboys. The type called leucochrome, with blue eyes and blond hair, showed a steady fall in frequency throughout the age period from 5 to 21 years. All other types were called allo-

chrome, and were divided into brunet, heterochrome and xanthochrome (pure blonds, other than leucochrome). The leucochrome is the type of infancy, from which all other types gradually arise through development of pigment. They fall to a steady ratio of 17 per 1,000 at the age of puberty. It is suggested that the leucochrome type is essentially a Mendelian recessive, the delayed development of pigment in the other types being a manifestation of delayed dominance, as in some animals.

Removal of Poison Glands of Rattlesnakes

PROF. JOHN TAIT of McGill University describes an operation for the surgical removal of the poison glands of rattlesnakes, devised to make the animals more amenable to physiological experimentation (*Copeia*, March 1938, p. 10). The snake is anaesthetized in a glass box containing dilute chloroform vapour and the operation, which is described in detail, occupies at top-speed twenty-one minutes, the depth of anaesthesia being gauged carefully throughout the process. The removal of the glands alters the shape of the head, which becomes narrow like that of poisonous colubrine or innocuous snakes. It has no effect upon the temper or health of the snake nor does it affect the maintenance or successional replacement of the fangs; fang-growth and replacement being apparently controlled independently of the associated poison glands. Another point of interest was that in one or two of the early trials the poison sac was perforated and venom flowed freely into the open wound; the poison was swabbed away so far as possible, but in no case did the snake show any harm from being deluged with its own poison. The procedure devised for deglanding should prove a useful advance, for it produces a wound that heals readily, no case of lethal sepsis having been recorded in operations on some hundred and twenty snakes. On the other hand, the old method of removing the fixed and reserve fangs usually resulted in an infection of the mouth, which was intractable to disinfection and resulted in death.

Development of Compound Eyes

AN important work upon the morphogenesis of the compound eyes of arthropods, by Francis Bernard, has been issued as Supplement 22 to *Bull. Biol. France et Belgique* (1937). In spite of differences in the minute structure of the elements of compound eyes, there is a common plan in their development and growth. Thus the development of parts follows a regular succession—optic ganglia, retina and peripheral pigmentary cells, cornea and crystalline lens. So in the growth of compound eyes—a subject little studied hitherto—Bernard finds that increase in size is due to additions of new elements or ommatidia formed in a lateral hypodermic zone. The elements do not reach the surface and become functional until two or three stages after the cell-divisions which originate them. The additional facets grow in regularly rhythmic series parallel with the stages of moulting, except in the crab, *Macropodia rostrata*, where phases of arrested development have been observed. Finally, the author devotes a chapter to the study of the structure of reduced compound

eyes, adding twenty new examples from his own observation. Reduction in the adult eyes is due to three distinct processes: simple atrophy or arrest of normal development as in the retina of all arthropods studied and in the crystalline cones of insects; hypertrophy of certain secretions, as in the rhabdome of all arthropods, and the cones of Crustacea; and degeneration in the course of larval life, as in the optic ganglia of certain parasitic Crustacea. This comprehensive study should facilitate new researches on the subject of morphogenesis in compound eyes.

Dextrality in *Limnæa peregra*

THE inheritance of dextrality and sinistrality in snail shells has been shown to be a phenomenon of considerable complexity with several peculiar features. The problem has been carried further in a long paper by Capt. C. Diver and I. Andersson-Kottó (*J. Genetics*, 35, No. 3). It has already been shown in *Limnæa peregra* that four types of broods exist: *A* broods, all dextral; *K* broods, all sinistral; *E* broods, sinistral with a few dextrals; and *F* broods, dextral with a few sinistrals. Sinistrality is also a simple recessive to dextrality, but owing to the nature of the character, it is determined in the egg before fertilization by the joint action of the genes in the zygotic constitution of the parent. The constitution of an individual is therefore determined by the brood it produces, and segregation is only visible in F_3 . *E* broods are genetically sinistral, but contain up to 20 per cent of phenotypic dextrals, the percentage varying in different strains. On the other hand, the sinistrals produced in *F* broods are usually genotypic as well as phenotypic. These and many other results of breeding experiments are explained on the hypothesis that *E* broods are the product of a series of modifying genes, some stronger in effect than others, which convert a homogeneous sinistral brood into a mixture. They follow the system of delayed inheritance, like the principal gene. The *F* broods are probably of different types, some of them due to a direct mutation from dextrality to sinistrality.

Action of One Plant Upon Another

A SHORT paper by Prof. F. E. Weiss (*J. Roy. Hort. Soc.*, 63, Pt. 4, 166-169, April 1938) directs attention to an interesting trend of modern botanical research, namely, the influence of one plant upon another. Relations between stock and scion, and between two symbionts are obvious instances, but there are also less patent influences. Prof. Weiss considered the work of Gurwitsch on mitogenetic rays, where the proximity of one plant has been held to induce cell division in another organism. Toxic substances released from one plant may inhibit the growth of another, and it is probable that the grass under the trees in some orchards has a deleterious effect upon the fruit crop. Ripening apples liberate a substance, probably ethylene, which can assist the maturation of later varieties, and also, according to Gane and Smith, can affect the germination of peas deleteriously. The late Prof. Molisch had experimented further in this direction, and found that very light doses of apple vapour assisted the germination of many kinds of seeds, where heavier applications were harmful. Leaf-fall in privet, elder and other plants was induced by the emanations from apples, which also stimulated the rooting of poplar and willow cuttings. Vapours from pot-bound roots of *Melaleuca squamea*

and *Acacia verticillata* accelerated the growth of vetch seedlings. It is obvious that more research is desirable, but the results collected by Prof. Weiss offer a most attractive field for future investigation.

A Virus and its Insect Vector

SOME ingenious experiments upon the relations between Hyoscyamus virus 3 and the aphid *Myzus persicae* are described in a recent paper by Mrs. M. A. Watson (*Proc. Roy. Soc. B.*, 125, 144-170, March 1938). Relations between a virus and its insect vector are often very close. The paper under review shows that the aphid can transmit the virus much more easily if made to fast before feeding upon infectious material. Previously fasted aphids, when fed for one hour on healthy plants before their diet was changed to infectious material, however, transmitted the disease no better than unfasted ones. Unfasted aphids quickly lost their power of infecting, whilst fasted insects retained this ability for a longer time. A consideration of these points leads to the supposition that the virus is inactivated by some substance acting during the digestion of food. Trypsin is known to inactivate the virus *in vitro*, and since this enzyme is not produced when an aphid fasts, the assumption that it acts as a substance toxic to the virus fits all the above facts. It is not yet clear, however, how such inactivation by a stomach enzyme could exert an effect through the salivary glands and proboscis, which are regarded as the organs of re-infection.

New Map of Graham Land

THE map of Graham Land, Antarctica, was considerably changed as the result of Sir H. Wilkin's flight ten years ago. Now as the result of the air and sledge journeys of the British Graham Land Expedition under Mr. J. Rymill, some of the older features of the map have been reinstated but with modification. The new map appears in the *Geographical Journal* of April and May accompanying an article by Mr. Rymill on the work of the expedition. The peninsularity of this part of Antarctica is again established. Casey Channel and Stefansson Strait disappear. Scripps Island, in about lat. 70° S., is a mountainous area of the mainland. But a remarkable new channel appears on the map. King George VI Sound, twelve to thirty miles in width, stretches for more than two hundred miles between the mainland of Antarctica and Alexander I Island. The latter is much increased in size and appears to be linked by shelf ice, probably of glacier origin, with Charcot Island farther west. The sound is filled with ice and was explored by sledge and aeroplane. At the most southerly point reached in about lat. 72° S. there was no sign of a channel to the east. The sound turned in a south-south-west direction and widened considerably, suggesting that it opened into a wide bay south of Alexander I. Island. The lack of a good route eastward towards the Weddell Sea prevented the exploration of the inaccessible western coast of that sea, which had been one of the main objectives of the expedition.

Cyclone Season 1934-35 at Mauritius

No. 17 of Miscellaneous Publications of the Royal Alfred Observatory by M. Herchenroder, entitled "The Cyclone Season 1934-35 at Mauritius", contains charts and descriptions relating to the eight cyclones

of that season with some reference also to five minor disturbances. The season was not a remarkable one, the number of cyclones and minor disturbances being the same as in 1933-34, except for the absence of cyclones around Mauritius and Madagascar in March and for the lack of evidence of any such storm throughout the entire season around the Cocos Keeling Islands. The author, in reference to a common notion that tropical cyclones are not accompanied by high pressure systems as is the case with intense temperate depressions, notes that five out of the eight here described disproved this notion in a striking manner. Four of these formed near Madagascar, and the accompanying anticyclone was easily identified with the aid of the South African weather reports. The incursion of this anticyclone north-eastwards into lower latitudes with the invasion of cooler air from higher latitudes appeared to be a preliminary event incidental to the formation of the tropical cyclone centre. It is suggested that perhaps only lack of information prevents a similar state of affairs from being demonstrable in the case of the formation of tropical cyclones in other parts of the South Indian Ocean. This lack of information, it is suggested, is unlikely ever to be got over by reports from ships alone. Attention is directed also, in this discussion, to another matter in connexion with the development of these cyclones, and that is the growing belief among observers that a necessary condition for such development is the extension of the cold easterly or south-easterly current of the accompanying anticyclone above the equatorial current, a belief referred to, for example, in the meteorological report of the Madagascar Weather Service for March 1935.

Effect of the Surrounding Medium on Fracture in Solids

P. Reh binder and E. Wenström (*Bull. Acad. Sci. U.R.S.S.*, 548; 1937) have shown in previous publications that 'brittle fracture' of solid bodies becomes easier on immersion in a suitable liquid, and that the surface hardness is reduced by this immersion. This phenomenon is connected with the reduction in surface energy produced by immersion. In the present work they show that the *plastic* fracture of wires stretched under a non-polar liquid (pure hydrocarbon oil) is greatly influenced by the addition of polar substances. For example, the time during which plastic flow takes place before fracture in lead may be reduced by a factor of 30-60 by the addition of 0.001-0.005 per cent of $C_{25}H_{51}COOH$. This effect is described as an 'internal lubrication' of the metal, and it is suggested that it plays an important part in the action of lubricated cutting tools.

Absorption of Fast Electrons

A. J. Ruhl ig and H. R. Crane (*Phys. Rev.*, 53, 618; 1938) have extended the work of Crane on the energy losses of high-energy electrons in thin lead sheets. The particles studied included a group 0.35-1.35 M.e.v. from radioactive phosphorus and a group up to 17 M.e.v. produced by the $Li + {}^1H$ gamma-radiation. In the lower energy region, the losses due to radiation are negligible according to the Bethe-Heitler theory, and the loss is due almost entirely to ionization processes. The experimental value for the energy loss is about three times that given by the theory of Bloch, and shows an increase on going from 0.5 to 1 M.e.v. which is difficult to understand. In the

high-energy group the energy loss is primarily radiative, and follows theory in a general way. The experimental values are appreciably higher than the theoretical.

Accuracy of Parallaxes

In a recent paper, Prof. W. J. Luyten shows that parallaxes determined from spectral class and proper motion possess a high *individual* accuracy, contrary to the generally accepted view that they are useful only for statistical investigation (*Mon. Not. Roy. Astro. Soc.*, 98, 5, March 1938). In 1923, the author published the spectra and hypothetical parallaxes for 100 stars of large proper motion, and in 1924 he published a list of hypothetical parallaxes for bright stars in the southern hemisphere. When these lists appeared, only a small proportion of the stars had known trigonometric parallaxes, but these have been determined for practically all of them since. Two tables show the comparison between parallaxes predicted and those determined trigonometrically, and the agreement is as good as we find between two different series of trigonometric parallaxes. There are a few cases where considerable discrepancies appear, but it is suggested that the spectral class used is wrong for three stars in the first list, and in the second list, taken from *H.C.*, 251, 1924, ρ Eridani, which shows a fairly large discrepancy, is an exceptional star, having a tangential velocity of only 8 km./sec., and a much larger mass than the mean for its spectral class. The author is of opinion that if accurate spectral classes, magnitudes and proper motions were available, it would be possible to predict the parallax of a star with a mean error of 23 per cent, corresponding to mag. 0.7 in the resulting absolute magnitudes.

Czech Astronomical Observations

MEMOIRS Nos. 3, 4 and 5 recently published by the Czech Astronomical Association at Prague give, respectively, results of solar observations, observations of variable stars, and the results of the expedition to Sara, U.S.S.R., to observe the total solar eclipse of June 19, 1936. The solar observations, which were carried out by nine of the Society's members, express the sun's activity during 1935 as given by sunspots, faculae and prominences. Using a direct-vision spectroscope and the $H\alpha$ line of the solar spectrum, the height of the chromosphere was also systematically determined around the disk. The variable stars discussed are RY Bootis, ST Camelopardalis and R Scuti, which have been regularly observed by members of the Society since 1930. R Scuti is shown to have a variability which places it in the RV Tauri type, that is, an irregular variable resembling to some extent a Cepheid, with a range of about two magnitudes and a variability in spectrum. The solar eclipse expedition included in its work (a) a study of the height and intensity of the chromospheric lines of the flash spectrum using the moving plate method; (b) the distribution of radiation at 0.56μ over the solar disk; (c) the sky spectrum during totality; and (d) a photometric study of the corona in the infra-red. The results are a useful quota to knowledge of the sun obtained under the rare conditions of a total eclipse, whilst the intensity determination of radiation across the disk affords an interesting comparison with the extensive observations made by Abbot some years ago without an eclipse.